

Translation

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference D-02005 PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/DE2003/002490	International filing date (day/month/year) 24 July 2003 (24.07.2003)	Priority date (day/month/year) 30 July 2002 (30.07.2002)
International Patent Classification (IPC) or national classification and IPC C08F 236/10		
Applicant SASOL GERMANY GMBH		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 01 March 2004 (01.03.2004)	Date of completion of this report 05 May 2004 (05.05.2004)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DE2003/002490

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed
- ☒ the description:
pages 1-13, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☒ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages 1-15, filed with the letter of 03 March 2004 (03.03.2004)
- ☐ the drawings:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DE 03/02490

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-15	YES
	Claims		NO
Inventive step (IS)	Claims	1-15	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-15	YES
	Claims		NO

2. Citations and explanations

Novelty

EP-A-0 304 589 discloses polymers based on butadiene and styrene, which polymers can be produced by means of anionic polymerization in an inert solvent in the presence of a catalyst (for example, butyl lithium) and a cocatalyst (for example, ethyl glycol-tert.butylether). To improve the randomizer effect, a surface-active compound (for example, sodium alkylaryl sulfonate) can be added in an amount of up to 1 mol per mol lithium (D1: claims, examples, page 4, lines 41-44). EP-A-0 304 589 does not disclose the use of a sodium alcoholate of formula M-OR (PCT Article 33(2)).

US-A-3 496 154 describes a method for polymerizing styrene and butadiene in the presence of a catalyst (for example, BuLi) and an alkaliorganic compound of formula R'OM (for example, Na-t-amylate or preferably K-t-amylate). The alkaliorganic compound is used in amounts of less than 0.333 mol per mol lithium (see table). US-A-3 496 154 mentions neither a dialkyl ether as a cocatalyst nor a ratio of alkaliorganic compound to lithium of greater than 0.5 mol.

EP-A-0 798 339 relates to SB copolymers that can be obtained by means of copolymerization of the monomers in the presence of an Li-organic compound (BuLi), a potassium alcoholate in an amount of 0.01 to 0.2 mol per mol lithium and an ether compound (for example, ethylene glycol diethyl ether). The present claims are novel over EP-A-0 798 339 with regard to the molar ratio (0.5 mol per 1 mol lithium) of the alkali metal sodium of the alkaliorganic compound and with regard to the dialkyl ether, in which the sum of C atoms in R1 and R2 is 5 to 7 (PCT Article 33(2)).

The publication FACHZEITSCHRIFT FÜR DIE POLYMER-VERARBEITUNG (see ISR) discusses microstructure regulators (for example, BEE) for producing tailor-made solution rubbers (for example, SBR). That document does not mention any alkaliorganic compounds of formula M-OR (PCT Article 33(2)).

Inventive step

EP-A-0 304 589 is regarded as the closest prior art.

In contrast to EP-A-0 304 589, the problem is that of providing vinyl-regulated rubber with a high styrene content and sufficient randomization of the monomers.

None of the other prior art documents cited in the ISR suggests using sodium alcoholates of formula M-OR in order to solve the stated problem.

Hence there are no prior art documents which, either individually or in combination, anticipate the subject matter of claims 1 to 15. The requirements under PCT Article 33(3) are therefore met.

Industrial applicability

The polymers according to claim 14, producible by means of the method according to claim 1, are industrially applicable as attenuation materials and in tire treads (claim 15) (PCT Article 33(4)).